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AUTOKON USERS CLUB MEETING

LA CIOTAT/BANDOL 11.12 M4Y 76

PAPER PRESENTED BY C.A.

J.P. BOISSARD

ALKON FROM LAY-OUT TO PRODUCTION ON THE
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EXAMPLE OF A DOUBLE-BOTTOM
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I - INTRODUCTION -
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This paper concerning the evolution of the use of ALKON at C .A. is the fourth presented at the occasion of an AUKKON Users Club meeting.

This time, we have chosen to present a concrete application of what a set of ALKON norms, when directed to a specific part of the ship structure can achieve.

The part of the ship concerned is the double-bottom, both in engine room and in cargo area.

The ship is a container ship convertible into cargo ship ordered in October 1975 and for which keel laying will take place beginning of 1977.

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11- GUIDELINES AND MAIN STEPS -
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As we have already outlined in the introduction, the "DOUBLE-BOTTOM" is one specific part of the ship structure for which one can easily imagine that an ALKON norm (or set of norms) can be applied.

The reasons which make easy the design by norms of a double-bottom are the following :

- 10) A double-bottom is a well delimited part of the ship-structure

It is composed of :

Shell-plating between two boundary transverse-frames

Tank-top plating including holes, openings or casings between the above transverse limits

Girders running longitudinally including holes and stiffeners

Floors in transverse frames, crossing girders, intercostal or not, including holes and stiffeners

- 20) A good "picture" of the complete double-bottom can be obtained from above i.e. looking at a horizontal projection of the tank-top.

Starting from these facts the guidelines of a double-bottom set of norms will be :

Generation of tank-top, based on the principle of giving maximum information concerning the underlying girders and floors

Approximate positioning of holes in successive floors and girders along a line of holes

Generation of floors and girders

Possible modification of hole-positions in a single floor/girder

Drawing of the resulting lay-out

In practical use from lay-out phase to production, we will proceed through the following steps :

- 1°) - Preparation of the lay-out according to the **above** guide-lines
 - Drawing of the lay-out
- 2°) - Automatic splitting or dividing of floors and girders when they intersect each other
- 3°) - Introduction of all the divided parts of floors and girders in the composition of a block-drawing
 - Execution of a block-drawing of double-bottom block
- 4°) - Transfer of double-bottom parts to production-phase for :
 - . production transformations
 - . production identification
 - . list of pieces, nesting and so on
 - . sketches of assembly-parts

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III- GOING THROUGH THE STEPS - ----= ----= ----= ----= ----= ----=

We will briefly go through the steps **and** will underline which are the items to take care of and which difficulties may arise.

"1.1 - Preparation Of the lay-out and drawings

We must first of all, as this has not been done before, state that this starting phase has been developed together with the drawing of the lay-out by AKER/SRS (especially Mr. K.JACQHN from AC).

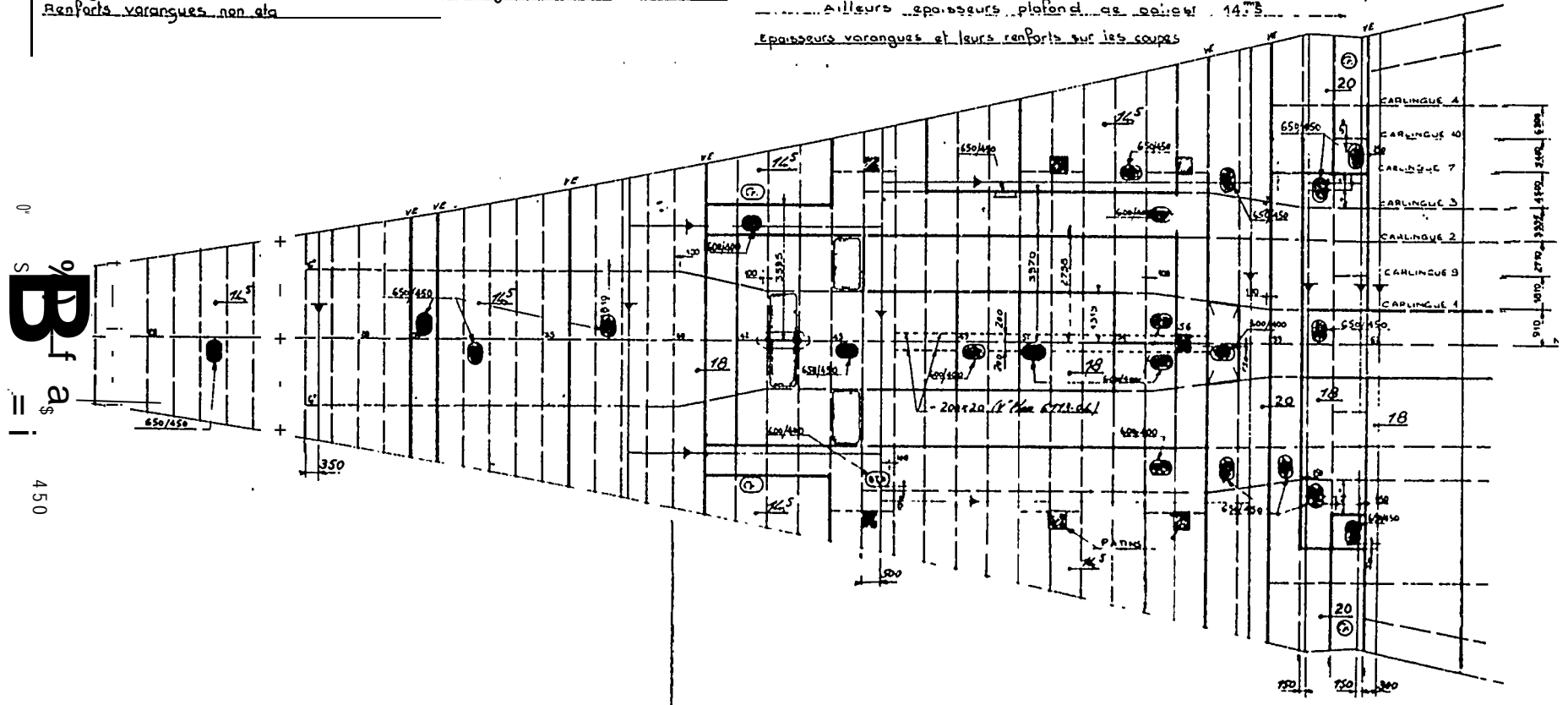
Generation of the tank-top

To obtain as a result the drawing of the tank-top (fig. 1) we have to generate successively by using appropriate norms :

vue de dessus

varangues élançhes.	varangues élançhes: 280 x 11 HP
Renforts varangues non éla	

essur ep. plat. ballast des
prises d'eau 20mm
Ailleurs épaisseurs profond de saie : 14.5
Epaissures varangues et leurs renforts sur les coupes



- a) - Tank-top contour in the area of the double-bottom : on the drawing the tank-top contour is shown as an arrangement of contours projected horizontally even when the tank-top is composed of planes which are not at the same horizontal level (change of height) or if some portions of planes composing the tank-top are inclined.

The resulting contour seen horizontally can then have knuckle-points.

- b) - Traces of girders in the tank-top
- c) - Traces of floors in the tank-top
- d) - (opening contours in the tank-top)

As a general remark, this intermediate result contains information concerning the hierarchy of a crossing between floors and girders (which one is going through, which one is intercostal).

Generation of floors and girders

For all the floors and all the girders, which, at this point, exist only under the form of their trace in the tank-top, appropriate norms will generate :

Contour of the floors, as intersection in the transverse plane of contour of tank-top and contour of shell

Contour of the girders by the same method, but with the difference that for girders

We will obtain two contours : the actual contour,
the projected contour in the XZ plane

Then, will be added to each floor and each girder:

the local stiffeners

the holes

Everything is now ready to produce, after the tank-top drawing, the drawings of :

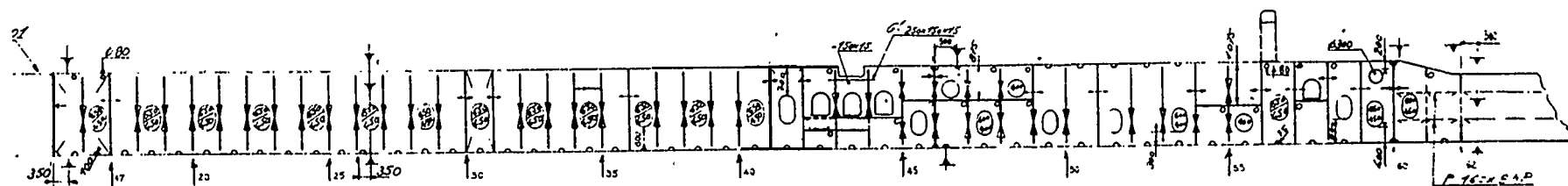
the girders in projected view (fig. 2)

the floors at every frame (fig. 3 some floors)

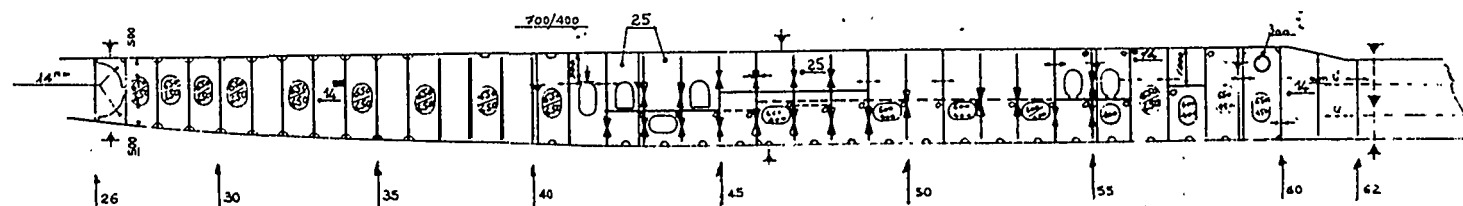
These drawings, after some modifications/additions (updating of records in the database), can be used, if ready at the right time, as a very good basis for classification drawings.

FIG. 2

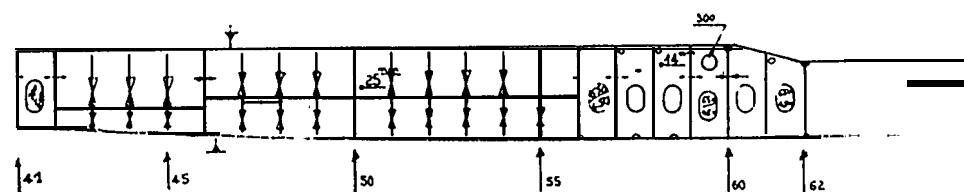
CARLINGUE CENTRALE vue de tribord



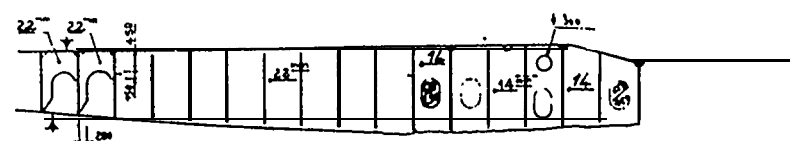
CARLINGUE N°1 vue de l'axe

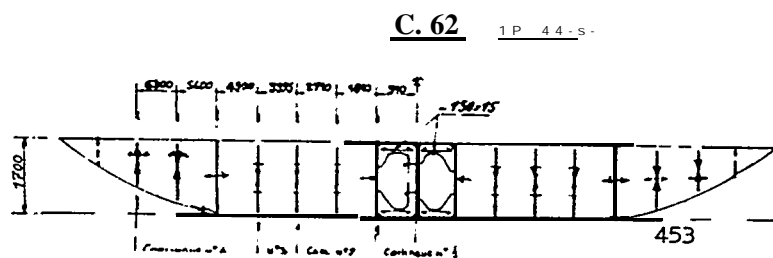
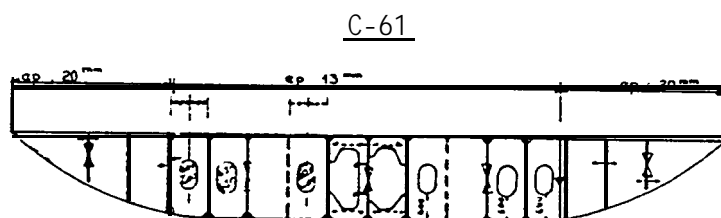
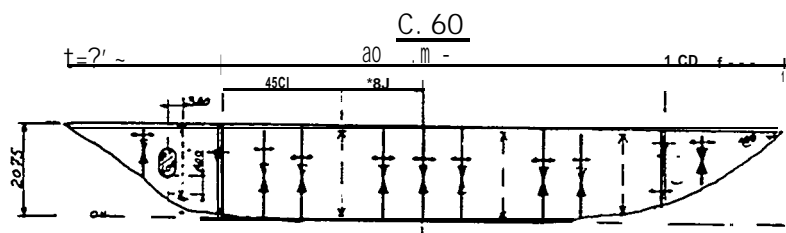
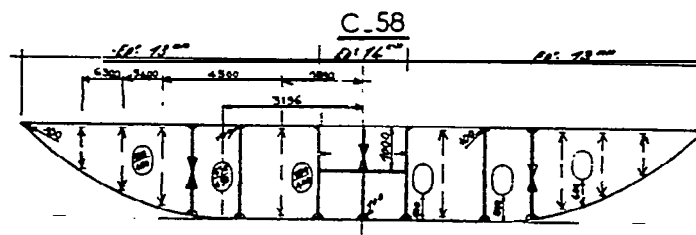


CARLINGUE N°2 vue de l'axe



CARLINGUE N°3 BABORD vue de l'axe





3.2 Automatic splitting/dividing of floors and girders when they intersect each other.

This step, for which the corresponding norms have been written at C.A., is intended for preparing the two next steps and consequently:

all parts belonging to a block must be generated separately

the same parts, most of them being already single production parts to be nested, must be ready for transfer to the production

This automatic step starts from the complete girders and complete floors and divides them at butts (in the case of girders) or between girders (in the case of intercostal floors).

It is the job of the norms to recognize each case of intersection between a girder and a floor and also to determine on each side of one element going through if the left/right part of the element divided is watertight or not.

For each girder/floor divided in several parts, there is an automatic identification system, and the list of identifications is stored (composition matrixes) so that the drawing norms will later refer only-to that list for drawing or not the part, if the part is or not included in the block.

One remark has to be made here: the standard version of double-bottom norm package generates only floor-parts with a contour between tank-top, shell and (if necessary) one or two girders, but in the case of a duct-keel for instance, close to the central girder, we have to re-generate semi-automatically (that means with a non-standard norm) the duct-keel special parts.

Another exception to the standard version is the case when an intermediate tank-top divides the floors horizontally. "This can only be solved by the afore-mentioned semi-automatic method.

The result of this step can be an intermediate drawing of no official use showing all the girders and floors divided and identified.

3.3 - Introduction of double-bottom divided parts in the composition of a block-drawing

Execution of the block-drawing

At this point, the specific way of generating a double-bottom must have produced-standard records in the database to allow the standard process of execution of block-drawings developed at C.A. '

The link has been realized by the preceding step.

Now, there will be a big composition list of everything included in the block, everything divided by the limits of the block and so on.

The computer has only administration work to perform in order to draw sequentially the whole content of the block.

When we analyse the contents of one view in the block drawing, it is composed of :

- Contour of the parts which are in the projection plane of the view

- Contour holes in the above parts

- Traces of longitudinals penetrating the surface (or stopped on it)

- Traces in the plane of the view of the parts included in other surfaces.

- (for instance in a transverse view, for double-bottom we will have traces of tank-top, shell and girders)

This can be seen in some extracts of block-drawing of the said double-bottom (see fig. 4 - 5 . 6 - 7).

3.4 - Transfer of double-bottom parts to production

As we have seen before, the work performed for preparation of block-drawing is not far from what the production is waiting for.

We will give the list of the production transformations which have still to be executed :

- Adding of cwerlength on s-me parts when necessary assembly purposes

- Take care of bevel when the angle between Floor and girder or between floor-part and shell is more than a certain value

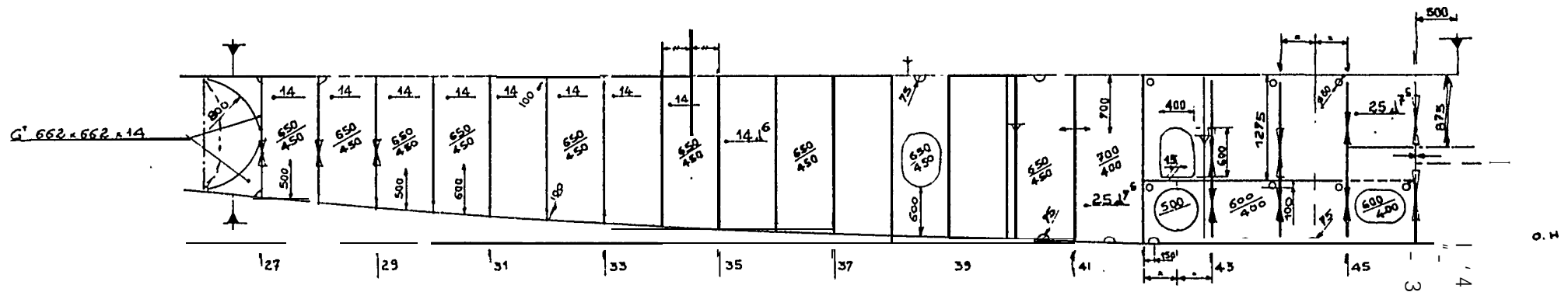
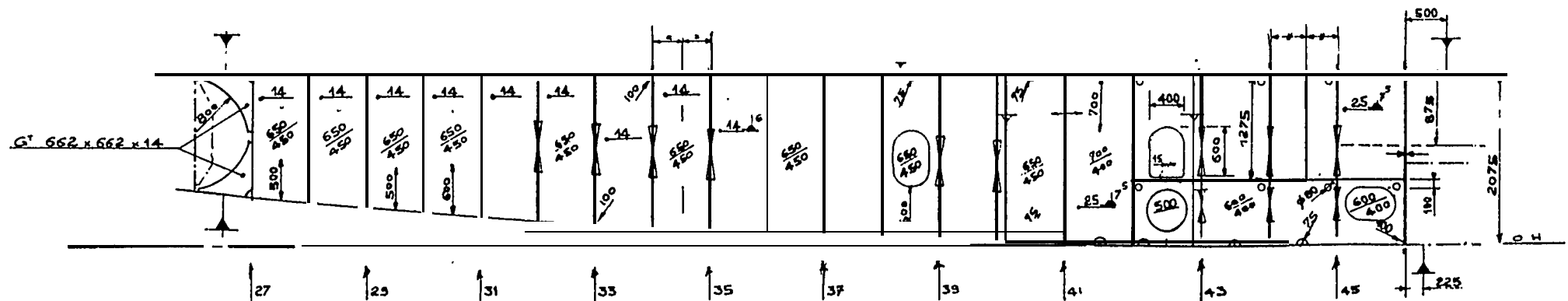
- Replacing of traces of stiffeners parts by marking lines in contours

- After that the production parts can be used :

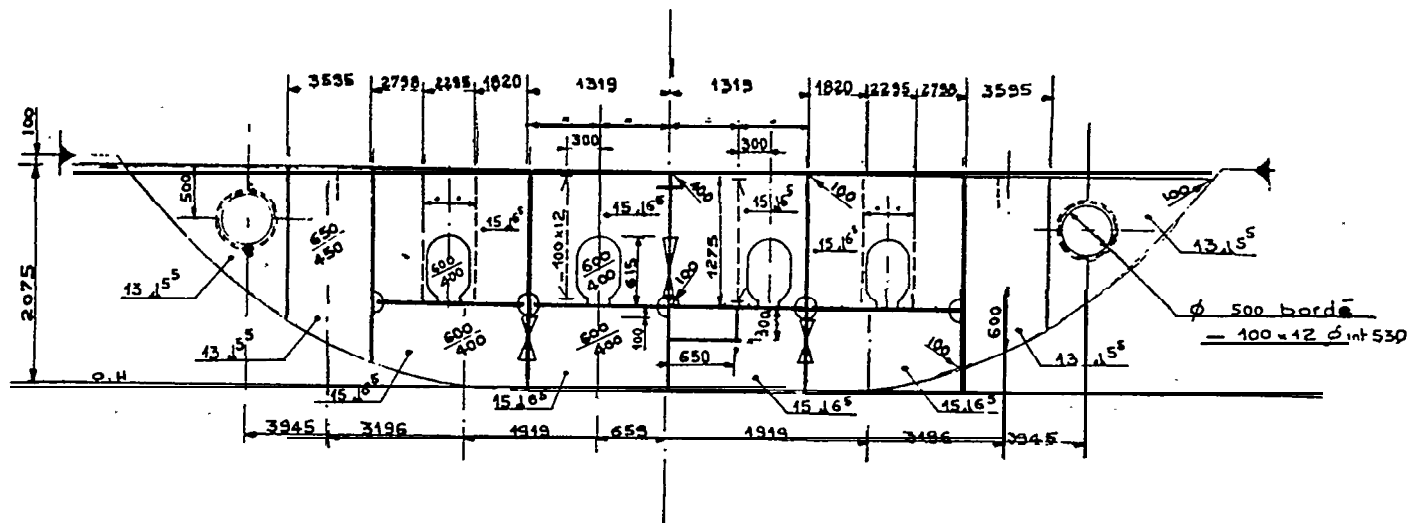
- . for nesting purposes

- . for assembly sketches

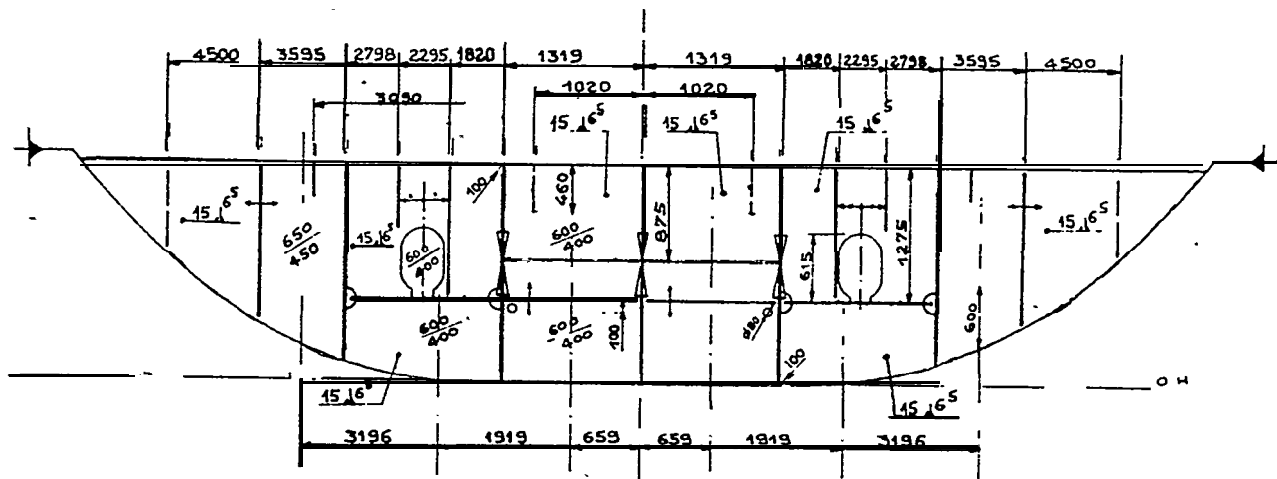
- . for lists of contents of blocks, assemblies and so on.

CARLINGUE N°1 BABORDvue de l'axeCOUPE A 1810 DE L'AXECARLINGUE N°1 TRIBORDvue de tribordCOUPE A 1810 DE L'AXE

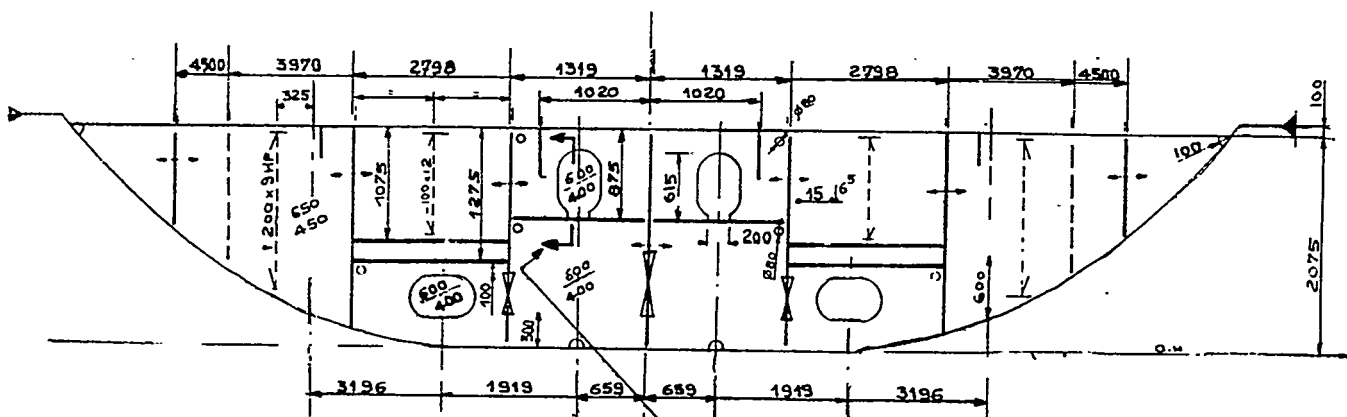
COUPLE 44 vue de l'AR



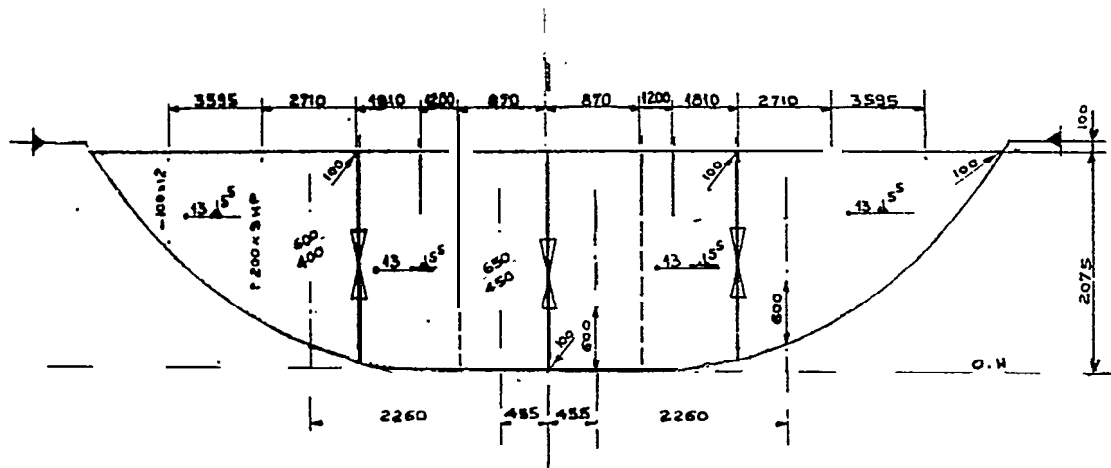
COUPLE 45 vue de l'AR



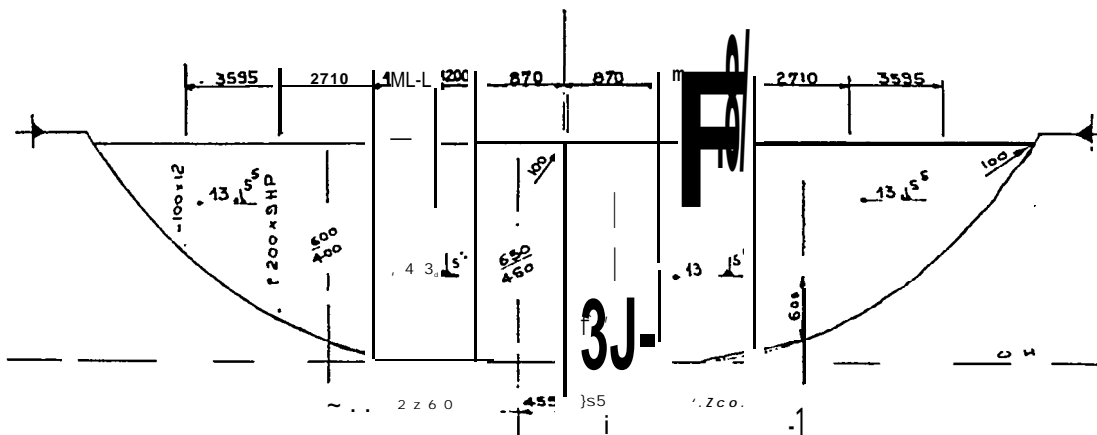
COUPLE 46 vue de l'AR



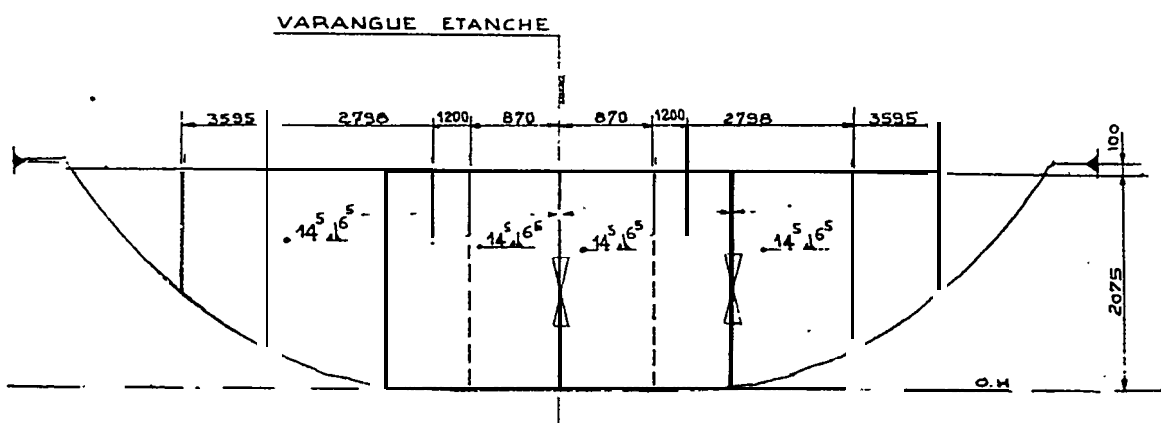
COUPLE 39 vue de l'AR



COUPLE 40 vue de l'AR



COUPLE 41 vue de l'AR



Iv - GENERAL REMARKS AND CONCLUSION CONCERNING THE COMPLETE PROCESSING
== == ,.,== ,== == == == == == == == == == == == == == == == == == == ==

OF A DOUBLE-BOTTOM -
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It is the first time at C.A that we have run the complete process on an extensive part of the double-bottom and not only for test purposes.

The results are very promising if we have the following conditions

In the first step (for classification drawings) the man in charge of the AUIXXON design of the 'double-bottom must be very experienced with the input-preparation of norms and must be in good contact with the people in charge of designing the d.b.

Modifications of the design are a common fact when designing double-bottom, especially in engine area.

The computer and drafting equipment turn-around must ensure a good response.

The -conclusion is, that, for other parts of the ship-structure especially for ships with a double-hull the guiding principles of the double-bottom norms might be applied.

The 27th of April

J.P. BOISARD

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